

REMARKS

Independent claims 1 and 13 have been amended to further characterize the spark erosion material as being a Pt alloy as defined in claims 19 and 20, respectively. Claims 19 and 20 have been canceled. New claim 21 corresponds to amended claim 13, but does not include the feature of an intermediate layer which is a preferred embodiment of the invention. Claims 22, 23 and 24 depending from claim 21 correspond to claims 14, 15 and 17, respectively. New claim 26 depending from claim 18 recites that the part of the flange portion of 1b (Fig. 2) extending outside the extension lines is entirely subsumed within the weld portion 3 as shown in Fig. 6.

This amendment also makes the requested correction in response to the objection to claim 13.

Entry of the amendments and review and reconsideration on the merits are requested.

Claims 1, 2, 6, 9, 12-15 and 17 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,215,235 to Osamura. Osamura was cited as teaching each of the method and spark plug as claimed in claims 1 and 13, respectively.

Applicants respectfully traverse for the following reasons.

In step (1), method claim 1 requires providing a chip comprising a flange portion and a protrusion protruding from a first face of the flange portion. With respect thereto, the Examiner cites Fig. 10 of Osamura and the area surrounding item 4 as disclosing the claimed flange portion. However, that is not what is shown in Fig. 10. Rather, Fig. 10 shows fused junction layer 4 constituted by an alloy wherein both the noble metallic firing tip 3 and the base electrode member 2 are fused and then hardened (column 8, lines 31-34). There is no disclosure of

providing a chip comprising a flange portion 1b and a protrusion 1a protruding from a first face 1c as shown in Fig. 2 and as claimed in present claim 1.

FIG. 2

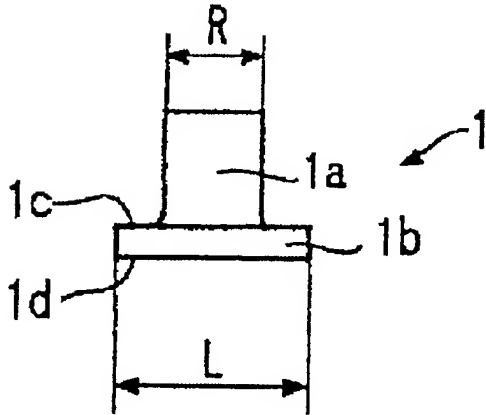
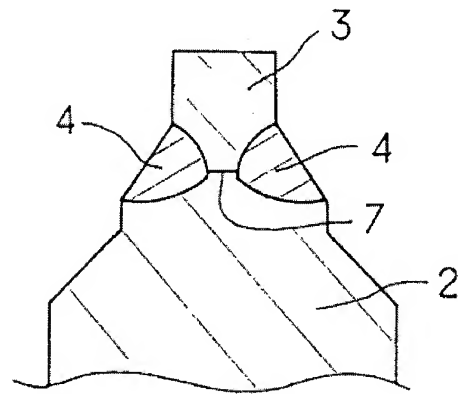


FIG. 10



With respect to step (2), the Examiner cites to column 8, lines 4-5. However, the subject passage of Osamura relates to temporarily fixing the bottom surface of noble metallic firing tip 3 onto the top surface 211 of rod portion 21 of the base electrode member 2 (as shown in Figs. 3A and 3B of Osamura), and has nothing to do with tentatively joining, through resistance welding, a second face 1d of the flange portion 1b opposite the protrusion 1a to a joint face of the electrode base metal of either the center or ground electrode as required by present claim 1. The difference is that in Osamura, the bottom surface of the chip is temporarily fixed by resistance welding to a top surface 211 of the base electrode member 2, whereas claim 1 requires tentatively joining, through resistance welding, a bottom face of the flange portion opposite the protrusion (corresponding to noble metallic firing tip 3 of Osamura) to a joint face of the electrode base metal. Osamura does not disclose a chip having a flange portion, or joining the

second face of the flange portion opposite the protrusion to a joint face of the electrode base metal as required by method claim 1.

Claim 13 is directed to a spark plug comprising a specific laser-weld portion connecting the ground electrode, the chip and intermediate layer. The Examiner cites to Figs. 1 and 10 of Osamura as meeting product claim 13. However, Osamura and specifically Fig. 10 relates to joining noble metallic firing tip 3 onto a base electrode member 2 of the central electrode 28 (column 7, lines 44-51), and does not show or relate to the ground electrode. As shown in Fig. 2 of Osamura, the noble metallic firing tip is laser-welded to the center electrode 28, and not the ground electrode as required by claim 13.

Moreover, although Osamura discloses that the noble metal firing tip comprises at least one selected from the group consisting of Pt, Ir, Pd, Ru, Rh and Os, this is not a specific disclosure of a Pt alloy containing at least any one of 20% to 60% by mass Rh, 10% to 40% by mass Ir and 1 to 20% by mass Ni as required by amended claims 1 and 13.

For the above reasons, it is respectfully submitted that claims 1, 2, 6, 9, 12-15 and 17 define novel subject matter, are not anticipated by Osamura, and withdrawal of the foregoing rejection under 35 U.S.C. § 102(b) is respectfully requested.

Claims 4, 5 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Osamura in view of U.S. Patent No. 4,581,558 to Takamura et al. Takamura et al. was cited as disclosing the claimed intermediate member.

Applicants rely on the response above with respect to the rejection over Osamura alone. Takamura et al fails to disclose the above-noted characteristic features of the invention as

claimed in amended claims 1 and 13 and fails to make up for the deficiencies of Osamura. Withdrawal of the foregoing rejection is respectfully requested.

Claims 18-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Application Publication No. 2001/005109 to Matsutani in view of U.S. Patent No. 6,653,766 to Hori. Matsutani was cited as disclosing steps (1) and (3), including providing a chip having a flange portion and laser-welding to produce a weld portion extending (slightly) inward of the extension lines. The Examiner relied on Hori as showing a spark plug that has portions that are joined through resistance welding so as to improve joining reliability (citing column 6, lines 62-65 and column 11, line 58). The reason for rejection was that it would have been obvious to modify Matsutani's invention to include a step of tentatively joining, through resistance welding, as suggested by Hori so as to improve joining reliability.

Applicants traverse, and respectfully request the Examiner to reconsider for the following reasons.

Claims 19 and 20 have been cancelled.

The method of independent claim 18 calls for laser-welding a chip comprising a flange portion to the electrode base metal of a ground electrode, whereas Matsutani's Fig. 1 illustrates laser-welding of electrode tip 12 to center electrode 11 via weld portion 2.

In Hori, disc-shaped chip 60 is temporarily joined through resistance welding to the front end surface 31 of the center electrode 30 (column 6, lines 62-65), and this is not a disclosure of joining a chip comprising a flange portion to the electrode base metal of the ground electrode which is the subject matter of claim 18. Moreover, the passage relating to joining reliability at

column 11, line 58 cited by the Examiner relates to the fused portion formed by laser welding as compared to resistance welding (column 11, lines 49-54).

For these reasons alone, it is respectfully submitted that claim 18 is patentable over Matsutani in view of Hori. More particular, the rejection fails to establish a *prima facie* case of obviousness because the cited prior art fails to teach or suggest laser-welding a chip comprising a flange portion to the electrode base metal of a ground electrode as required by claim 18.¹

Applicants respectfully request the Examiner to consider separate patentability of new claim 25 depending from claim 18, which yet further distinguishes the claimed method from Matsutani and Hori. As claimed in new claim 25, the spark erosion resistant material (i.e., the chip joined to the ground electrode) is a Pt alloy containing at least any one of 20% to 60% by mass Rh, 10% to 40% by mass Ir, and 1% to 20% by mass Ni. On the other hand, the electrode tip of Matsutani is formed from an alloy which contains a predominant amount of Ir and at least one component selected from between 30-50% by weight Rh and 1-10% by weight Pt. See paragraph [0018]. Matsutani goes on to further teach in paragraph [0018] that when the Pt content is in excess of 10% by weight, the melting point of electrode tip decreases and the electrode tip becomes less workable than an Ir electrode tip such that the Pt content is more preferably 2-7% by weight.

The above-noted disclosure of Matsutani at paragraph [0018] is not a description of the spark erosion material which is a Pt alloy containing only a minor amount of Ir in stark contrast

¹ To establish *prima facie* obviousness of the claimed invention, all the claim limitations must be taught or suggested by the prior art. MPEP § 2143.03.

to the alloy of Matsutani containing a predominant amount of Ir and no more than 10% by weight Pt. Namely, the electrode tip of Matsutani containing a predominant amount of Ir can never be a Pt alloy of claim 25 containing no more than 40% by mass Ir. Thus, for this additional reason, it is respectfully submitted that new claim 25 is further distinguished from Matsutani and Hori.

The above-noted limitation as incorporated into independent claims 1 and 13 also distinguishes these claims from Matsutani.

Applicants respectfully request the Examiner to consider separate patentability of new claim 26 depending from claim 18, which yet further distinguishes the claimed method from Matsutani and Hori. As claimed in new claim 26, the claimed method provides a spark plug where that part of the flange portion extending outside the imaginary extension lines is entirely subsumed within the weld portion. This feature is neither disclosed nor suggested by the combination of Matsutani and other references, because the flange portion extending outside imaginary extension lines in Matsutani is not entirely subsumed within the weld portion. This is clear, for example, from Fig. 2 of Matsutani.

Withdrawal of all rejections and allowance of claims 1, 2, 4, 5, 6, 9, 12-18 and 21-26 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

AMENDMENT UNDER 37 C.F.R. § 1.114(c)
U.S. Appln. No.: 10/695,796

Attorney Docket No.: Q78216

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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